

CRRU UK CODE OF BEST PRACTICE

Best Practice and Guidance for Rodent
Control and the Safe Use of Rodenticides

July 2021

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Campaign for Responsible Rodenticide Use UK

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Foreword

The 'CRRU Code of Best Practice' (COBP) has been a cornerstone of the UK Rodenticides Stewardship Regime since its publication in 2015. It was used as a foundation for the content of CRRU-approved training courses that provide certification of professional competence in rodent pest management. It is also referred to as the document that informs best practice in the published standards of farm assurance schemes. The Code introduced for the first time the concept of 'risk hierarchy' in rodent pest management.

However, five years after the COBP first appeared, the CRRU Best Practice Work Group now considers that enough has changed about the regulation and permitted practical uses of professional rodenticides that a revision is needed. It used to be the case that many rodenticides could be used in all places where rodents were found. However, an important regulatory change was brought about by the European Commission requiring that manufacturers now apply for authorisation for each type of use, such as 'in and around buildings (also known as 'outdoors around buildings'), 'open areas', 'sewers' and others. Also, many common use scenarios are now termed 'non-standard uses', such as burrow baiting and the application of baits without the use of tamper-resistant bait stations, and these must now be specifically applied for and appear on product labels. Likewise, permanent baiting could previously be employed with any product authorised in the UK but is now permitted only for products that are authorised for such use. These and other important changes to the way we conduct rodent pest management for public health and hygiene are reflected in this revised version of the COBP.

The Code was initially conceived to be 'guidance' on best practice for practitioners and was not intended to imply any statutory obligation. This situation has changed because reference is now made to the COBP on all rodenticide product labels authorised for use by professionals, with words such as "*Using this product in a manner that is inconsistent with the label may be an offence. Refer to the CRRU UK Code of Best Practice (or equivalent) for guidance*".

As was the case with the 2015 version, the new COBP is not intended to be a detailed practical manual. Instead it provides guidance principles and sign-posts further reading intended to give all necessary detailed information. In particular, CRRU has provided detailed additional documents on permanent baiting and environmental risk assessments. Elsewhere are to be found in-depth texts on anticoagulant resistance management, the practical aspects of rodenticide applications in urban environments, rodent pest management for gamekeepers and many more. All additional referenced documents are available from internet sources.

Much changed in the practice of rodent pest management and the use of rodenticides with the introduction in 2016 of the UK Rodenticide Stewardship Regime. All those who purchase professional rodenticides must provide a certificate of competence at the point of sale, having undertaken approved training and passed examinations. All rodenticide point of sales outlets are audited by an independent agency, BASIS (Registration) Limited, to ensure that these rules are followed. All approved farm assurance schemes publish standards that require that any rodent pest management conducted on assured farm premises must be carried out in accordance with guidance in the COBP. The COBP itself has been distributed in hard-copy format by the thousand to practitioners and has been down-loaded from the CRRU web-site electronically by thousands more. As we await the heralded major review of the regime by the Government Oversight Group, led by the Health and Safety Executive, we must hope that the desired changes to use practices and the degree of wildlife exposure to rodenticides are reflected in the data obtained in the monitoring programmes that are either conducted by CRRU contractors or carried out directly by CRRU.

I must end by giving grateful thanks to the members of the CRRU UK Best Practice Work Group who have given time from their very busy professional lives to reassess and revise this document. They wisely left alone what did not need to be changed in its predecessor but, after thorough scrutiny and evaluation, revised all that was no longer current.



Dr Alan Buckle

Chairman, Campaign for Responsible Rodenticide Use
University of Reading

June 2021

Background

The revised CRRU Code of Best Practice brings together our most recent understanding of the safe and effective use of rodenticides, acknowledging their risks and providing practical advice so that risks are minimised. Much of the material in the document is, indeed, not new because it is based on two Health and Safety Executive (HSE) Information Sheets (Information Sheets MISC 515 and AIS 31). These are now withdrawn but for many years provided necessary basic information about safe and effective rodent control, in both rural and urban environments, and particularly about the application of rodenticides.

Anticoagulant rodenticides are essential in food hygiene and for the protection of human and animal health, but the fact is that the way we were using them resulted in widespread contamination of non-target wildlife in the UK. Some of the exposed species are of high conservation value. This contamination may have been happening either because current guidelines were then inadequate or because they are not properly followed. Whatever the cause, a new approach is evidently needed. This new approach is now provided by the UK Rodenticide Stewardship Regime, which is co-ordinated by CRRU UK. The revised COBP is fundamental to the delivery of the Stewardship Regime.

The CRRU Code of Best Practice is more about changing emphasis than it is about changing practice. In the past, rodent control practitioners may have considered rodenticide application as their primary intervention. Now it must be seen to be a temporary solution that becomes necessary only when other procedures have been fully considered and implemented, where appropriate, to make sites less conducive to rodent infestation. It is no longer acceptable to bait sites repeatedly, entailing well-known risks to wildlife, while obvious measures to make them less amenable to infestation are ignored.

For some time, tamper-resistant bait boxes have provided a false impression that it is safe to deploy such equipment on sites and to apply anticoagulant rodenticide baits permanently in them. We now know that some of the contamination seen in UK wildlife is the result of non-target small mammals entering bait boxes and feeding on bait.

We understand this pathway of exposure because some of the most contaminated non-target species, such as barn owls and kestrels, feed almost exclusively on small mammals and hardly at all on target rodents. Permanent baiting may sometimes be required, and is permitted under certain tightly-controlled conditions, but it must be the exception and not a routine business model through which a service of rodent control is provided to clients.

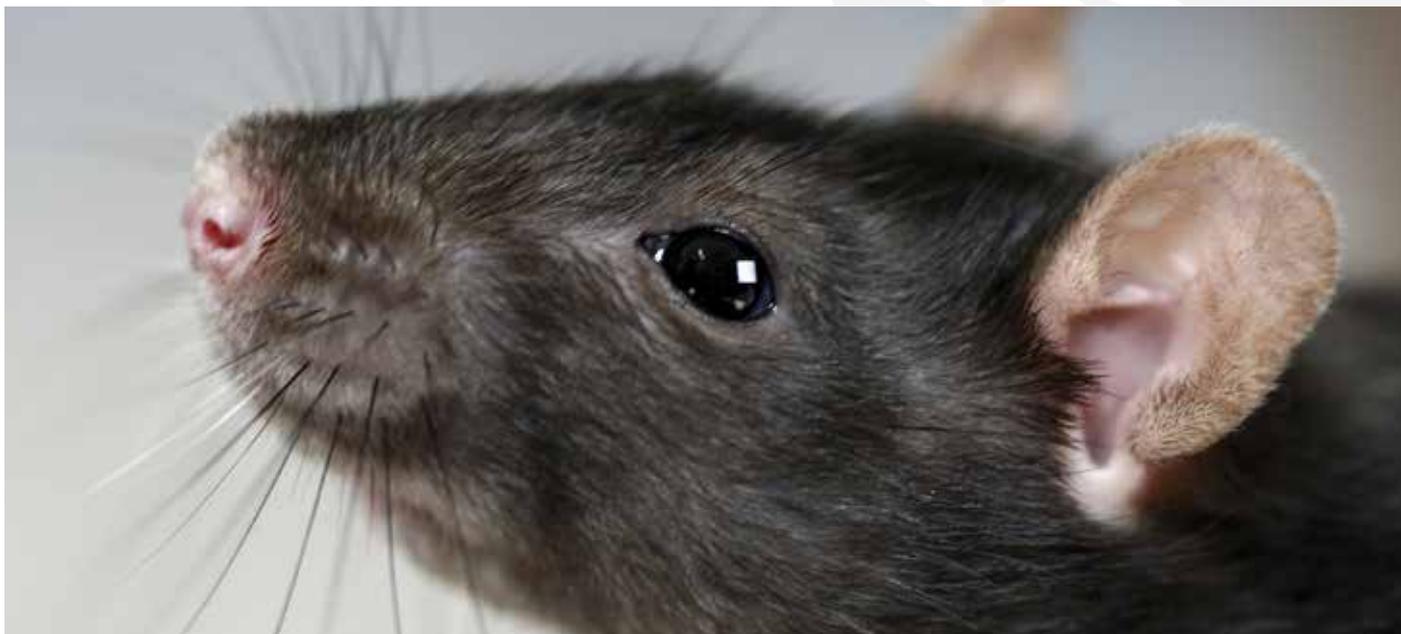
The concept of 'risk hierarchy' should be at the forefront when deciding a rodent control strategy for any site. The key here is that any intervention conducted must be potentially effective but, in the risk hierarchy, the least severe methods must always be used first. It is not necessary that all options in the risk hierarchy should be employed, and found to fail, before an effective solution is reached. But all should be considered and a record made.

The revised COBP, and the advice it contains, will be integrated into existing and new training courses for those who conduct rodent pest management in all user sectors, including professional pest control, local authorities, agriculture and gamekeeping. Those with existing qualifications can be brought up to date with the new concepts and advice. All those who use rodenticides authorised for professionals are encouraged to maintain knowledge, gained from achieving approved certification, by joining an established Continuing Professional Development (CPD) scheme.

The status quo is not an option. Practitioners must become better acquainted with the risks inherent in the use of rodenticides, especially when they are applied outdoors, and implement all appropriate risk mitigation measures. The strategies and methods described in this document will promote effective rodent pest management and result in reduced risk of accidental exposure of humans and non-target animals.

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1. INTRODUCTION

- 1.1 Rodents pose a threat to people's health and to health and hygiene in animal husbandry. They may cause significant damage to commodities, especially stored food and animal feeds, and to the fabric of buildings and infrastructure, such as electrical cables, drains and sewers. In particular, rodents pose a risk to food safety and food hygiene because they are attracted to areas where food is stored, prepared and sold and because many food-borne pathogens are carried by rodents and transmitted to humans, companion animals (pets) and to farm livestock.
- 1.2 A range of statutory obligations with regard to pest infestation is imposed on local authorities, employers, land-owners, householders and those involved in the food industry. A wide range of quality standards make necessary the management of rodent infestations throughout the food industry, including on many agricultural enterprises. In some cases these require a pest-free status as a contractual obligation. Many other legal instruments refer to rodent infestation in different situations and impose a requirement to take the necessary steps to control and remove rodents.
- 1.3 This document gives guidance on the strategies to employ to avoid rodent infestations and on the precautions you need to consider when carrying out treatments to control the two main pest species in the United Kingdom, the Norway rat (*Rattus norvegicus*) and the house mouse (*Mus musculus*). Note that no rodenticide products are currently authorised in the UK for use against field mice (i.e. *Apodemus sylvaticus*

and *A. flavicollis*). Therefore, all references in this document to 'mice' are to the house mouse.

- 1.4 This guidance is aimed at all those who conduct rodent control operations as professional users of rodenticides, holding certification demonstrating compliance with UK rodenticide stewardship regime requirements. A wide range of users fall into this category including those working as professional pest control technicians, both in the public and private sectors, agricultural workers who conduct rodent control as a part of their duties on farms and holdings, those who carry out rodent pest management in the gamekeeping industry.

2. RODENT CONTROL STRATEGY

- 2.1 It is important to review approaches to control holistically and to integrate a range of control measures into your treatment strategy. Consider all available controls, not just the use of rodenticides, but also include simple measures such as clearing away rubbish and proofing of buildings. Relying on rodenticides alone does not guarantee that the infestation will always be eradicated, and numbers may quickly recover after treatment. It is important that following the application of measures to reduce rodent numbers you should consider ways of improving environmental management of the site. This should provide effective long-term control of rodent infestations. You should concentrate particularly on improving hygiene and proofing, maintenance and repair of buildings.

2.2 The primary aim is to avoid infestation, as once established, rats and mice can be difficult to control. Operations that are intended to prevent rodent access to food, water and to remove places of rodent harbourage for shelter and breeding rarely have significant impacts on non-target animals. All necessary operations that would contribute towards making sites less attractive to rodents should be implemented by those who are responsible for them.

2.3 In contrast, all interventions aimed at the removal of rodents, including the use of traps and sticky (glue) boards, and the application of rodenticides, such as gases, contact gels/foam, liquids and poisoned baits, have the potential to harm non-target animals and the environment. Although these risks can be mitigated by following best practice, they cannot be entirely avoided. Therefore, the principle strategy when choosing methods for the control of rodents is to employ methods that have the least risk of adverse impact (i.e. are the least severe) but which will be effective in the prevailing circumstances. This is the concept of “risk hierarchy”.

2.4 A thorough survey of the site to be treated should always be carried out. Decisions on the methods to use and any necessary risk mitigation measures will be determined by the findings of this survey (see section 5.5).

2.5 The welfare of target and non-target animals should always be considered when conducting a rodent pest management programme. Animals should only be harmed when there is no other practical way to protect human health and well-being, and welfare impacts should be minimised wherever possible. Of course, the best approach is to reduce the likelihood and scale of rodent infestations by removing food sources and harbourage and by using proofing to exclude rodents from buildings and resources. All chemical rodent control methods that are intended to kill animals will have adverse impacts on rodent welfare. A review by the UK government found all anticoagulants and cholecalciferol to be ‘markedly inhumane’, although alphachloralose was considered to be ‘relatively humane’ (see <https://www.ufaw.org.uk/rodent-welfare/rodent-welfare>). The review also found that hydrogen cyanide and aluminium phosphide cause suffering but are more humane than anticoagulant rodenticides and cholecalciferol (see Further Reading).



Trapping, both using live-capture traps and kill traps, also impacts rodent welfare (see section 3.6). Only traps that are appropriate for use against rats and mice should be used. The degree of suffering caused during kill trapping will depend on the time until the rodent becomes irreversibly unconscious, which will be determined largely by the body strike location and the power of the trap. Proficiency is needed in setting kill traps to maximise the likelihood of a clean catch. Glue (sticky) boards are a type of live trap which should only be used indoors and only when less severe alternatives are likely to be either impractical or ineffective (see section 3.7). Pest species taken in live-capture traps cannot be released and must therefore be quickly and humanely despatched using an appropriate method, such as a concussive blow to the head. Rodents found alive in kill traps should also be quickly and humanely despatched. It is essential that operators are skilled in the method of humane despatch used as the impact on animal welfare will depend on the speed and proficiency with which it is applied. For Norway rats only use products suitable for use with that species, and likewise with house mice. More information on the animal welfare consequences of rodent pest management and on the use of rodent traps is provided in the ‘Further Reading’ section.

3. THE 'RISK HIERARCHY'

3.1 General

The term 'risk hierarchy' has for several years now, been applied to the use of rodenticides. The concept is that those intending to use any rodent control method, or combination of methods, should first consider their risks. These include risk to humans, domesticated animals, non-target animals and the environment. Risks will differ between the situations in which control is to be conducted and the degree and type of risk presented by the various methods. The use of the risk hierarchy requires that the least severe method/methods (i.e. having least risk) should be used, provided there is a reasonable expectation that the resultant operation will achieve the results required. Generally those methods that do not employ a rodenticide, such as improved site hygiene and proofing of buildings, are likely to present less risk than those that require a rodenticide. An environmental risk assessment (section 7) should be conducted before application of rodent control measures and will assist appropriate consideration of the risk hierarchy.

It is important to remain aware that each site is different, and will require a different set of measures, either to prevent rodent infestation or to remove an infestation when it has become established. Any measure you may consider could present a lower risk at one site and a higher risk at another. Beyond that, no hard and fast guidance can be given about the 'risk hierarchy'.

A specific antidote to all anticoagulant rodenticides is vitamin K₁ and should be administered by a veterinarian or physician as part of a treatment plan in case of accidental poisoning. The non-anticoagulant active substances listed below do not have specific antidotes. However, treatment regimens and advice can be provided by a veterinarian or doctor in case of accidental poisoning.

You should consider the following general points when making decisions about which methods to use.

3.2 Efficacy

In many situations in which rodents present a risk of harm to humans and animals, there are statutory responsibilities for their removal. Therefore, a principal consideration must be the suitability of measures selected to achieve the results required to reduce or remove rodents.

Control measures based on the use of rodenticides must be proven to be sufficiently effective by those

who seek authorisation to sell them. Efficacy data may be available in the public domain or obtained from manufacturers. All other methods, including the use of traps and sticky (glue) boards, are not regulated with respect to efficacy. Their efficiency is uncertain and dependent on the competence, perseverance and (often) the ingenuity of those employing them.

It should be noted that killing rodents can only provide short term control of populations. Sustainable control can only be achieved by reducing the rodent carrying capacity of the environment (see sections 3.3-3.5).

There is evidence to suggest that resistance to rodenticides in some areas of the country is spreading. Professional users should be alert to this phenomenon and be prepared to adjust their control strategy if anticoagulant resistance is encountered (section 7).

3.3 Proofing

Although they may be costly and require frequent maintenance, measures to prevent the ingress of rodents into buildings provide a long-term solution to rodent problems and are usually without adverse environmental impacts. These measures should always be implemented where practicable. Proofing also needs to take account of the presence of bird species as these are protected under the Wildlife and Countryside Act 1981. Care is also required where a building is to be rodent-proofed and may provide a roost for bats (see Further Reading).

3.4 Denial of food and water

Operations intended to prevent rodent access to foodstuffs, such as the use of rodent-proof bins and close-fitting doors, are also likely to be substantially free from non-target impacts, although of course such action will also prevent access to any other animals, such as wild birds, that may be relying on these food and water sources.

3.5 Removal of harbourage

In order to deter rodent infestations, sites should be cleared of all debris, rubbish, old machinery and equipment, unwanted stores of straw and hay, etc. Vegetation should be cleared around buildings and immediate surroundings to provide an open perimeter, so that natural predators can take rodents. If possible, areas around buildings may be laid to concrete, or another hard surface, to prevent rodent burrowing. Once again, the only non-target impacts of such operations will be on the other animals that rely on the materials taken away

for cover and harbourage. For example, stacks of straw and hay bales are best removed during winter because they often provide breeding sites for barn owls.

3.6 Trapping

Trapping, whether using live catch or killing traps, has several advantages. Any animals destroyed can be removed from site, and there are no chemical residues. However, if not done properly, trapping is a risk to non-target animals. An environmental assessment will permit the likely extent of this risk to be determined. Several statutory instruments apply to the process of trapping vertebrates. It is essential before setting rodent traps, especially those used outdoors for rats, to consider both the target animals and any others that may be present and may enter traps accidentally. Only spring traps approved under the latest Spring Trap Approval Orders (STAOs) may be used, although break back traps commonly used against rats and mice are exempt from this. England, Wales, Scotland and Northern Ireland now have separate STAOs. To minimise risk to non-target animals, where possible livestock and pets should be excluded from the trapping area, and approved killing traps must be set in natural or artificial tunnels which are suitable for the purpose. It is now illegal to trap stoats in spring traps that have not been specifically approved for them, so extra care is needed where they may be present (see Further Reading : Code of Practice for Use of Vertebrate Traps.).

3.7 Glue (sticky) boards

Glue (or sticky) boards present few non-target risks when they are used indoors for rat and mouse control but, nevertheless, a risk assessment should be carried out to determine potential impacts on non-target animals such as small birds and bats. However, many authorities, such as the Department for Food and Rural Affairs (Defra), the Chartered Institute of Environmental Health (CIEH), the British Pest Control Association (BPCA) and the National Pest Technicians Association (NPTA), consider that these devices can cause acute physical suffering, fear and stress to trapped animals, particularly if used inappropriately and where there are delays in re-inspection times (see Further Reading: Code of Practice for the Humane Use of Glue Boards).

3.8 Chemical Control Methods

There are a number of chemical control methods available to control rodents. It is important to be aware that each one carries a risk to humans, non-target animals and the environment. The method chosen will be specific to the individual site of treatment, and should be considered as part of the risk assessment for that site. For more information on the risks inherent to each method, please see use

restrictions on product labels. The active substances fall into two groups: 1) the anticoagulants and 2) the non-anticoagulants, all of which have a different mode of action (see Annex 3). The chemical control methods available in the UK are as follows:

First-generation anticoagulants

The available first-generation anticoagulants coumatetralyl and warfarin are less acutely toxic to some species and less persistent in animal tissues than the second generation compounds (see below). It may be assumed that they present a lower risk of both primary and secondary poisoning for non-target animals in most use situations. Therefore, their use is to be preferred over that of the second-generation compounds against Norway rats in those areas where there is no resistance to them (see section 7). First-generation anticoagulants should not be used against mice because resistance in this species is widespread (see Annex 3). However, they are not free from risk to non-targets and larger quantities of these baits must be applied to ensure that surplus is always available for rats to feed upon. It may also take longer to control rat infestations when using them. The application of first-generation anticoagulants where there is resistance to them is bad practice and presents a risk to non-target animals, especially when ineffective treatments are prolonged.



Second-generation anticoagulants

The second-generation anticoagulants, brodifacoum, bromadiolone, difenacoum, difethialone and flocoumafen, are toxic and have long biological half-lives. Therefore, in the 'risk hierarchy' they present the greatest risk to non-target animals and the environment. There is evidence that they may cause the deaths of non-target animals and they are widely present in the environment in the bodies of many non-target species, some of high conservation value such as barn owls, red kites, kestrels and peregrine falcons. They should be used only when other methods of achieving rodent control have been carefully considered and found to be unable to provide an effective solution to the rodent pest problem present at the site. It is not possible to rank these compounds in respect of risk. However, resistance to brodifacoum and difenacoum, among both Norway rats and house mice, should be considered when deciding which of the five compounds to use (see Annex 3 and section 7).

Cholecalciferol

Cholecalciferol baits may be used against Norway rats, black rats and house mice, including resistant strains (see Annex 3). Cholecalciferol is not persistent in the environment and therefore it may be assumed to present a lower risk of secondary poisoning. However, it is not free from risks to non-targets as it is, like many rodenticides, acutely toxic to some species.

Alphachloralose

The acute rodenticide alphachloralose may be used indoors for the control of house mice, including resistant strains (see Annex 3). Among chemical methods of rodent control, and when applied correctly, it may be considered to present fewer risks to humans and non-target animals than some other substances.

Phosphine gas

Phosphine gas is authorised for use in the UK against Norway rats in burrows not less than 10m away from any occupied buildings. Provided care is exercised to ensure that fumigated burrows are only occupied by target rodents, the use of products that emit the toxic gas phosphine are unlikely to have primary non-target impacts. There is also no likelihood of secondary toxicity. However, these products carry significant risk to those transporting and applying them and current advice to users is as follows:

- Assess the risk to yourself, others and the environment prior to commencing work and adopt the necessary operational and engineering controls appropriate for the work or substitute the control measure for a physical or less toxic method (COSHH/risk assessment).

Other stringent requirements are also applied to ensure the safe use of these products including restrictions on how close to buildings they can be used, the use of special application equipment and personal protective equipment, prevailing weather conditions, the training and competence of users and disposal of used containers (see Further Reading: The RAMPS UK Code of Good Practice. Register of Accredited Metallic Phosphide Standards in the UK).

Hydrogen cyanide gas

Hydrogen cyanide is authorised for use in the UK against Norway rats by application as a fumigant in empty structures. Methods of application and risk mitigation measures to protect those making the application, bystanders, non-target animals and the environment are highly specialised and technically challenging. This control measure can therefore be applied only by companies that have specially

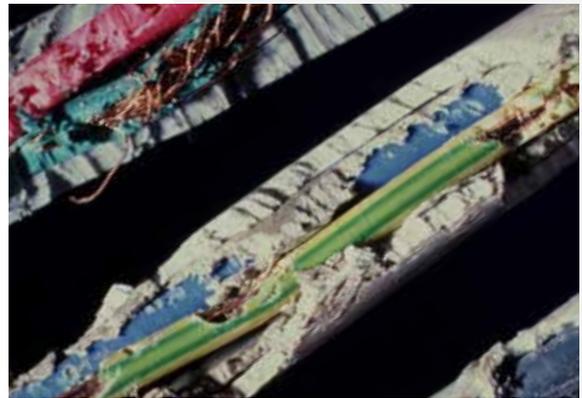
trained and certificated technicians and appropriate equipment. Properly carried out in empty buildings this procedure will carry little environmental risk.

3.8 Personal protective equipment

Those who conduct rodent control treatments should use any personal protective equipment (PPE) that is recommended on the product label and in their own risk assessments.

4. AVOIDING RODENT INFESTATIONS

The best way to deal with rodent infestations is not to have them in the first place. There are two main approaches.



1. Exclusion - The aim is to keep rodents out of vulnerable buildings.

This objective needs to be realistic and practical and take account of the physical capabilities of rats and mice. In rural environments, buildings offering an attractive environment and a source of food are most vulnerable to rats during autumn and winter when they are likely to exploit weaknesses or faults in the structures or associated areas. Mice are less responsive to seasonal changes, mainly because they live within the fabric of buildings. Their small size means that they can be easily introduced into otherwise secure buildings via the delivery and movement of materials such as feedstuffs, wood shavings and any other bulk items that are capable of providing a temporary refuge. Effective proofing of buildings or other structures against mouse entry is often extremely difficult due to their ability to get through very small gaps but efforts to limit entry will have some beneficial effect.

Routine inspections and repair to identified faults or damage should be implemented. In most situations it is best to control the rodent infestation before carrying out any proofing work. Although there may be some additional cost, the improvements

will benefit the rodent control and prevention programme in the long term. Metal baffles around services such as cables and pipes and kick plates on the lower edges of doors will prevent them being gnawed by rodents. Door access that is only required occasionally can be temporarily proofed by adding a concrete fillet or wire mesh to the vulnerable ground level sections. Depending on the circumstances, drainage pipes or gullies should be proofed by fitting grilles, flaps, crushed wire mesh or other suitable materials.

The staff on site should be made aware of the importance of avoiding the creation of rodent access routes and harbourages when undertaking building works, modifying existing structures and when making changes to the management of the building. In the course of structural work it may be appropriate to incorporate access points to allow checks to be made for rodent activity and permit the placement of rodenticide baits.

2. Hygiene – Two main areas require attention.

a) Feedstuffs

It is essential, wherever possible, to prevent rodent access to food. Food storage structures should be proofed against rodent ingress. Shortcomings in the storage and handling of food and feedstuffs, particularly where spillages occur and are allowed to remain, can be a significant factor in providing attraction for rodents and reducing the uptake and acceptability of rodenticide baits. Spoiled foodstuffs should be disposed of in such a way that they are inaccessible to rodents. Rats also require a source of free water, while mice in general do not. Water sources should be removed where this is possible.



However, both rats and mice have unrestricted access to feed present in many situations – particularly in some animal-rearing systems, such

as free-range poultry and pigs and gamekeeping, where game-birds receive supplementary feeding in hedgerows and coverts. In these systems, every effort should be made to prevent access to foodstuffs by rodents. If this is not done, long term problems with rodents will remain.

b) Harbourage

Within and around buildings the availability of a wide range of materials will provide habitat for rodents. The following will encourage the presence of rodents:

- a build-up of rubbish around and within buildings
- suspended ceilings and uncapped block walls
- wall and ceiling insulation materials with direct access to them for rodents
- the long-term storage of materials such as wood shavings, straw/hay bales and packaging in areas accessible to rodents
- stores containing equipment and spare parts
- natural vegetation cover
- ditches, hedges and banks, especially when poorly maintained
- rubbish dumps, bins for fallen stock and incinerator sites
- drainage systems and elevators or gantries that may provide a link between buildings

All these areas require attention if sites are to be made less attractive to rodents as places to live and breed.

5. WHAT TO DO BEFORE TREATMENT

5.1 General

Much can be done prior to the establishment of rodent infestations to make their occurrence less likely. If precautionary measures such as proofing and hygiene, discussed in the previous sections, are rigorously implemented rodent infestations will be infrequent, small and easy to deal with when they occur.

Small infestations of rats and mice can often be removed using physical means, such as traps. However, sometimes rodent infestations become established that require the application of rodenticides. The choice of rodenticide, or other rodent control measure, to use should be made after consideration of the 'risk hierarchy' described above (section 3), having completed a thorough

inspection of the site to be treated and after the performance of any necessary risk assessments.

The sections that follow in this document describe best practice in the application of rodenticides for the control of infestations of rats and mice.

5.2 Details of the site

In commercial premises, public buildings or on agricultural land, it is important to establish who to report to on site and if there are parts of the site where pest control technicians may have restricted/no access.

If the site has been treated before, it is good practice to review the previous strategies, advice and potential problems associated with the site before visiting. It is important to involve any persons responsible for the site when considering the range of rodent control measures you intend to adopt. If previous advice has not been followed, then this will need to be revisited, underlining the importance of environmental management in the successful control of rodent populations. It is unacceptable to treat sites repeatedly with rodenticides when the rodent problem could have been solved by proper maintenance of buildings, carrying out a thorough programme of hygiene and removal of food and harbourage.

Where applicable, it is also important to explain to those who have responsibility for the site that you will need regular access to the site during any treatment phase and at the end to remove bait that has not been eaten. Convenient times for revisits should be agreed.

5.3 Areas of Use

Under the new rules different rodenticide products may carry the same active substance but may be authorised for different uses. Therefore it is essential to read labels carefully and to apply rodenticides only in those areas where their use is permitted by the product authorisation. When in doubt it is wise to consult either the distributor or the manufacturer before purchase.

“Indoors” is defined as:

Situations where the bait is placed within a building or other enclosed structure and where the target is living or feeding predominantly within that building or structure; and behind closed doors. If rodents living outside a building can move freely to where the bait is laid within the building, then products restricted to use indoors should NOT be used. Open barns or buildings and tamper-resistant bait stations placed in open areas are not classified as indoors.

(Source: HSE (2012). Environmental risk mitigation

measures for second-generation anticoagulant rodenticides proposed by the UK. Health and Safety Executive. Available at URL: <http://www.hse.gov.uk/biocides/downloads/ermm-sgar.pdf>. 30 pp.)

Note: The application of baits in sewers is no longer considered to be a use encompassed by the ‘indoors’ scenario and such use is now considered separately.

“In and around buildings” is defined as:

‘In and around buildings’ is understood to include the entire building that is the subject of the treatment, or those areas of it that are infested, as well as the infested area around the building that needs to be treated in order to deal with the rodents that are moving into the building from outside.

The term ‘outdoors – around buildings’ is now the officially authorised use and is seen on some product labels and in regulatory documents and has the same meaning.

“Open areas” are considered to be:

European Commission documents describe uses “around farmland, parks and golf courses” as typical of open area applications. The term is also used when “rodenticides are used to reduce impacts on game rearing or outside (i.e. in field) food stores (potato/sugar beet clamps)”. An open area is therefore one that fits neither of the two preceding definitions and is an urban, suburban or rural space that is not directly associated with a building.

[The source document guiding the above definitions of ‘in and around buildings’ and ‘open areas’ is: EC (2009). Risk mitigation measures for anticoagulants used as rodenticides. European Commission, Directorate-General Environment, B-1049 Brussels, Belgium. Document CA-May09-Doc.6.3c. 8pp.]

“Sewers” are now considered to be specialised areas of use and only products with labels that say they can be applied in sewers should be used in that way. All products that are authorised for use in sewers carry labels that say “Baits must be applied in a way so that they do not come into contact with water and are not washed away”.

“Waste dumps” are also now considered to be a separate use scenario. Only baits may be applied at waste dumps that permit such use on the label. Waste dumps are particularly challenging for a number of reasons. There is usually abundant alternative food that may compete with baits for the attention of target rodents. This food is also an attraction for a wide range of non-target animals that may also be present at the site and may be at risk. Operations at the site may mean that substrates are moved and there is a likelihood that

baits will be disturbed. All these considerations require special attention when conducting treatments at waste dumps.

5.4 Non-standard Uses

The European Commission has identified several methods of application of rodenticide baits that are termed 'non-standard' uses. These uses therefore require a specific application for authorisation from manufacturers, based on submitted arguments of justification. When so authorised, product labels will show appropriate text. Those using these non-standard methods should always check the labels of products to ensure that such use is permitted.

5.4.1 Permanent baiting

Permanent baiting is, perhaps, the most widely employed non-standard use. It is the application of a rodenticide product, in the absence of an extant infestation, so as to obtain evidence of the presence of immigration onto the treated site and to prevent the build-up of a new infestation. This is only permitted with products approved for this use on the label and when conducted by professionals. Permanent baiting is strictly limited to sites with a high potential for reinvasion when other methods of control have proven insufficient and can only be carried out with products authorised for this use. When used outdoors, the period between visits should not be longer than every four weeks. Further detailed guidance on permanent baiting is provided in a CRRU document (see Annex 1 and Further Reading: CRRU Guidance Permanent Baiting, revised July 2019).

5.4.2 Covered and protected bait points

The default requirement in the application of rodenticide baits is the use of tamper-resistant bait stations to reduce the exposure of non-target animals. However, it is recognised that the use of this equipment may either delay the consumption of bait by some individual rodents that are reluctant to enter bait boxes or, perhaps, prevent it altogether. Therefore, where manufacturers have been granted appropriate product authorisations, it is permissible to use other methods to make bait safe. Generally, the expectation is that any 'covered and protected bait points' should be at least as secure from non-targets as a tamper-resistant bait box.

5.4.3 Burrow baiting

The direct placement of baits into rodent burrows is another non-standard use that may be permitted when using some authorised products. This practice carries additional risks but these risks are sometimes

justified when there is no other alternative to get rodents to take baits. A particular risk is that of bait being ejected from the burrow and laying unprotected outside the entrance, where it may be accessible to non-target animals. Therefore, additional risk mitigation measures are required and these measures are given in Annex 2. There is published evidence that more bait is consumed more quickly by Norway rats, when bait is applied directly into burrows compared to applications using bait stations. Therefore, provided necessary risk mitigation measures required for burrow baiting are adopted (Annex 2), shorter treatment times, with less rodenticide available to small non-target mammals, resulting in lower risks of exposure to wildlife, may be anticipated using burrow baiting. Burrow baiting is therefore an important consideration of an environmental risk assessment.

5.4.4 Pulsed baiting

Pulsed baiting is an operational requirement imposed by the labels of certain anticoagulant products. It is used when applying some products that contain the most potent second-generation active substances. In this, limited quantities of bait are put out at bait points which are replenished only at fixed intervals. The intention is to reduce to an effective minimum the quantities of bait used and, thereby, to reduce emissions to the environment. Pulsed baiting should only be used with those products which mention this practice on the labels.

5.5 Site survey

You should carry out a site survey to establish the type, level and extent of the infestation. The survey will help you to identify important factors (e.g. the degree of public access to the site; the presence of children and non-target animals, such as pets, farm livestock and wildlife) that will influence your choice of control strategies for that site. Evidence of poor housekeeping and hygiene, alternative sources of food and water, and obvious building/drain defects should be noted on the site plan. It may be useful to obtain photographic evidence of poor environmental management practices.

During the survey, try to establish the rodents' food and water sources. This will be particularly important if you intend to use rodenticide baits as a part of the treatment strategy. Reducing the availability of alternative food and water at the start of the treatment, or shortly afterwards, can encourage rodents to feed on your bait. Where there are rats present you should note obvious defects, such as broken pipes, defective sewer chamber covers, bad brickwork, stoppers missing from the

rodding eye or surface water gullies, and bring them to the attention of the responsible person, where applicable.

Where there is an obvious risk that may allow rat invasion from neighbouring properties, it is good practice to tell the responsible person of the risk that this may pose and where appropriate report it to the local authority, which may be able to take appropriate action.

A record of the site survey should normally be kept.

5.6 Risk Assessments

5.6.1 General

The information gathered during the survey should enable you to identify hazards on the site and determine the risks posed to:

- human health (e.g. through accidentally eating bait, particularly by children)
- non-target animals present such as pets, farm livestock and wildlife (e.g. through eating bait and/or poisoned rodents and/ or other wildlife, such as field mice and voles)
- the environment through contamination of soil and water courses

Consideration of these risks will determine which methods are most appropriate for dealing with the rodent infestation. After considering control measures, such as proofing, improvements in hygiene environmental management and non-chemical approaches to control (e.g. traps), you may conclude that you still need to use a rodenticide. Before carrying out any treatment involving rodenticide you should conduct appropriate risk assessments.

The environments in which rodent pest control procedures are to be carried out, for example on farms, in factories and in other commercial premises, may be intrinsically hazardous and it may be necessary to conduct a general assessment of risk in the workplace in order to comply with the Management of Health and Safety at Work Regulations 1999 (see Further Reading: Risk assessment. A brief guide to controlling risks in the workplace.).

There is a requirement to record the findings of risk assessments unless they are so simple that they can be easily recalled and the conclusions explained at any time. However, small companies with fewer than five employees are not required to keep a written record, although it is good practice to do so.

5.6.2 COSHH assessment

Control of Substances Hazardous to Health Regulations 2002 (the COSHH assessment) require assessments to be carried out to identify any risks to operators and others who may be affected by treatments involving hazardous substances.

The COSHH assessment will help ensure that any rodenticide product you select, and its method of application, will result in effective pest control with least risk to yourself and anyone else who may come into contact with the rodenticide (see Further Reading: Working with substances hazardous to health: A brief guide to COSHH.).

5.6.3 Environmental risk assessment

It is good practice to conduct an environmental risk assessment when a risk to the environment has been identified during the site survey. This assessment will consider the following:

- what the treatment is designed to achieve, what methods of rodent control may be used and how will success be measured
- which protected species may be present in or near the treatment site
- what risks to non-target species have been identified
- summarise the steps taken to prevent, or adequately control, exposure of wildlife and the environment
- what are the facilities for the safe disposal of dead rodents and rodenticides
- what is expected from the persons responsible for the infested site
- what follow up measures are required
- what environmental management measures are appropriate when the infestation has been removed to make the site subsequently less conducive to rodents

In order to carry out an effective environmental risk assessment you must have good knowledge of the various pathways by which wildlife and of the non-target animals may become exposed to rodenticides (see Further Reading: Environmental assessment when using anticoagulant rodenticides in the United Kingdom.).

It is good practice to record this assessment in writing and a template for an environmental risk assessment is available from the CRRU UK website (see Further Reading: Environmental risk assessment form.).

5.7 Active substances

Active substances used in baits are divided into three main groups, reflecting the way they work. Acute rodenticides act rapidly (within 24 hours), but may induce bait shyness if a sub-lethal dose is taken. Sub-acute rodenticides may not cause death for several days, even though a lethal dose may be consumed during the first 24 hours and feeding may continue during this period. Chronic rodenticides are slow-acting and the anticoagulants belong to this group. They cause death in a minimum of 2-3 days, but on average it takes 5-7 days.

Anticoagulants can be sub-divided into first- and second-generation anticoagulants (respectively FGARs and SGARs), based on their potency, or into multi-feed and single-feed anticoagulants, depending on the quantity required for a lethal dose. All anticoagulants have the advantage that a specific antidote (vitamin K₁) is available in the case of accidental ingestion. The first-generation anticoagulants have the advantage that they are less toxic to non-target animals and are less persistent in the environment. However, they are not recommended for use against house mice because of the prevalence of anticoagulant resistance in that species. The second-generation anticoagulants have the advantage that they require less bait to be eaten for the ingestion of a lethal dose and because resistance to them is less prevalent. However, they are more highly toxic to non-target animals and are more persistent in the environment.

The non-anticoagulant rodenticides, alphachloralose, aluminium phosphide, carbon dioxide, cholecalciferol and hydrogen cyanide, carry the important advantage that their modes of action are different to that of the anticoagulants. They are therefore equally effective against rodents that are anticoagulant susceptible and anticoagulant resistant.

Your choice of active ingredient will be determined by the characteristics of the site, previous treatment history (if available), the conditions set out on product labels, the outcomes of the COSHH and environmental assessments and consideration of the 'hierarchy of risk' described above. Another important consideration in the selection of active ingredient is the presence or absence of anticoagulant resistance. It exacerbates resistance problems, and is an unnecessary risk to non-target animals, to use any active ingredient against rodents that are resistant to it (see section 7).

5.8 Bait formulations

The bait formulation used should be appropriate to the conditions and circumstances of the infestation. A wide range of ready-to-use products are authorised in the UK under the Biocidal Products Regulation (BPR) (EU) No. 528/2012 in a range of formulation types, including:

- cut, rolled or whole grains
- pellets
- block baits
- granules
- edible lards/gels/pastes
- contact gels and foam
- liquids

Once again, your choice of bait formulation will be determined by the characteristics of the site, previous treatment history (if available), the conditions of the product labels, the outcomes of the COSHH and environmental assessment. Generally, particulate baits may be more palatable to rodents than blocks but blocks may be better in adverse environmental conditions, such as sewers. When baiting burrows, treated grain is less likely to be kicked out of burrows by rats than blocks.

Consideration should be given to the type of bait formulation used and whether it could compromise security by being removed, hoarded or spilled during baiting operations. You must check the authorisation conditions granted for each product you intend to use.

Remember:

- only use a product that is authorised in the UK under the Biocidal Products Regulation (EU) No. 528/2012. These products are identified by the authorisation number on the product label e.g. "Authorisation number: UK-yyyy-nnnn" (y=year, n= digit)
- follow the directions for use on the product label and other information supplied with the product
- make sure you carry out all precautionary measures identified in your own COSHH assessment and environmental risk assessment
- follow guidance provided in relevant codes of best practice such as this

Failure to do this may result in action by the enforcement authorities.

5.9 Toxic gases

Two rodenticide products are authorised for use which are applied to rodent burrows where they evolve a toxic gas (phosphine) to exert a fumigant effect. Because of the obvious hazards of such products to human health, certain regulations apply to where they can be used, who can use them and how they should be applied. A COSHH assessment is always required when they are used and an environmental assessment is recommended. Only those with the necessary proof of professional competence for their use can purchase and use these formulations. The risks to non-target animals is small so long as every effort is made to ensure that only target rodents inhabit treated burrows.

They are not known to leave long-lived toxic residues in the environment or to have any secondary toxic effects. Whilst gassing is unlikely to provide the complete solution to any rat infestation, it can be a valuable method of reducing the size of a rat population quickly, and following which rodenticide baits, or another appropriate rodent control measure, can be used more effectively to control the remaining population. More information on the safe use of products that evolve phosphine gas and on training courses for their safe and effect use is available (see Further Reading: The RAMPs UK Code of Good Practice.).

Two other toxic gases are available, carbon dioxide and hydrogen cyanide. However, they are not for general use as their applications are conducted only by trained technicians using specialised equipment.

6. GUIDANCE FOR TREATMENTS

6.1 Use a variety of control methods

It is important that you do not rely solely on the use of rodenticides to control rodents. Programmes that integrate a range of methods, including physical and/or biological control, will be more successful in the long term than those that rely solely on chemical means. While trapping is labour intensive, it can prove useful in controlling small infestations and may provide an alternative means of control where the use of rodenticides is unacceptable. Break-back traps for use against mice and rats are available but care should be exercised where stoats may be at risk as by-catch because it is only legal to trap them in specifically approved traps. If you intend to use live-traps, they should be inspected regularly, at least once a day, and any captured animals humanely despatched. Failure to do so could risk prosecution under the Animal Welfare Act 2006. Advice about the use of kill and live-capture traps is available (see Further Reading: Code of Practice for Use of Vertebrate Traps).

Although the use of rodent glue boards is permitted, this method does raise concerns about humaneness. You should consider all other options before adopting this method of control and clearly justify its use for each treatment. When using rodent glue boards, the frequency of inspection and dispatch of captured animals should follow that recommended in the Pest Management Alliance code of practice for the use of glue boards (see Further Reading).

If you have decided to use a rodenticide, choose a product, and the active substance it contains, according to your consideration of the risk hierarchy, the outcome of any risk assessments you may have conducted and the results of the site survey.

6.2 Rodent behaviour

Rats are particularly shy animals and nervous of strange objects that appear in their territories. It may be better to protect and secure bait points using existing materials (i.e. to use 'covered and protected bait points'), rather than introduce bait boxes but only if this use is permitted by the product label. During the survey, note any general features that you could use to place bait safely. This may eliminate the need for bait boxes and be more effective in bringing the rodents into contact with the bait. It may also reduce the total length of time bait needs to be laid and therefore reduce the likelihood of non-target animals coming across it.

House mice are generally more inquisitive, and so are less likely to avoid new objects in their environment. As a general rule, mouse control is more likely to be successful if small amounts of bait are placed at a large number of locations. These general descriptions of rat and mouse behaviour hold true in many situations. However, eccentric behaviours by rodents are increasingly reported including the refusal of rats to take baits in the presence of established, long-term sources of alternative foods and mice which refuse to approach any apparatus of rodent control including bait boxes, traps and sticky boards.

Remember that rats may carry bait away and hoard it, or drop it in areas where children or non-target animals can come into contact with it. If more bait is being consumed than expected for the size of the infestation, consider whether hoarding may be a problem. If you think it is, search for any caches of bait and deal with it safely. You should secure any place pack/sachets or blocks at the placement site or reconsider the bait formulation being used. It will be more difficult for rats to hoard large quantities of loose grain bait and the quantity of rodenticide in single pellets or grains will be substantially less than in intact packs/sachets or blocks, reducing the potential risk to non-targets if bait is dropped by rodents.

6.3 Placing the bait

Always follow label instructions about how baits may be applied. Of paramount importance is a requirement to prevent access to bait as far as possible by humans and non-target animals. This is normally achieved by the use of commercially-available tamper-resistant bait stations. However, some products may be applied using protected and covered bait stations constructed from locally available materials, provided the degree of protection achieved is equivalent to that given by commercial tamper-resistant bait stations, or they may be placed directly into rodent burrows.

Outside buildings you may find rats in burrows, piles of rubbish, vegetation or other materials, sheds and garages or other buildings, compost heap/bins, drains, ditches and hedgerows. In all these places you must make sure bait is adequately protected from children and, as far as possible, non-target animals. If you place bait in rat burrows, when permitted by product labels, treated grain is less likely to be re-exposed by rats than are blocks. Either cover the entrances of baited burrows to reduce the risks of bait being ejected and spilled or lightly block the burrow with a twist of straw or grass. Sites where burrow baiting is used should be visited more frequently than those where secure bait boxes are employed because of the greater likelihood of bait coming out of the burrows and being taken by non-target animals (see Annex 2).

Baits applied inside, and if not in bait stations, should not be placed directly on the floor as these are difficult to remove at the end of the treatment. Use plastic bait trays or other measures to keep bait where it is put and to facilitate recovery. You also need to take account of the risks from bait being disturbed as a result of activities of rodents or other animals or changes to the site as a result of human activities. You should consider the size and the likely reactions of the rodent population (i.e. identify areas where rats may feel uncomfortable).

If you cannot find suitable cover to protect baits, you will have to use other measures unless (for indoor baiting) you can control or restrict access to the areas where bait is laid. You can make your own boxes for this, as long as they are fit for this purpose and provide a degree of protection for the bait that is at least as effective as that provided by commercial bait stations. Alternatively, you can buy commercially available tamper-resistant bait stations.

There is currently no UK or European Standard which gives confidence that a particular bait station provides a necessary minimum level of protection to the bait. However, a document published by the European Commission states that an effective tamper-resistant bait station should meet the following criteria (see Further Reading: Concept of “tamper-resistant” bait station for the use of anticoagulant rodenticides.):

1. Resistant to tampering by children and dogs
2. Weather-resistant

Where your COSHH assessment identifies it as necessary, you should ensure bait stations are secured in position (e.g. when the bait is of a type that could be shaken out), and that you have followed the instructions to prevent the container

being opened.

When bait stations are used, they should be clearly marked to show that they contain rodenticides and that they should not be disturbed. Bait stations should be labelled with the following information: “do not move or open”; “contains a rodenticide”; “product name or authorisation number”; “active substance(s)” and “in case of accident, call a poison centre”.

An important point to note is that tamper resistant bait stations and covered and protected bait points only protect baits from non-target animals that are larger than the target rodents. It is increasingly recognised that residues of anticoagulants found in wildlife are derived from baits accidentally taken by non-target small rodents, such as field mice and voles. Baiting should be avoided where an environmental risk assessment indicates that feeding on baits by non-target small mammals is likely. Mouse droppings found in bait stations away from buildings will almost certainly be from these animals and are indicative of wildlife exposure to the rodenticide in use.

A recent development is that of species-specific bait stations which permit access by Norway rats while excluding small non-target rodents.

Another point to note is that predation of slugs and snails, which have consumed anticoagulant rodenticide, is a suspected contamination route of hedgehogs, shrews and starlings. Sparrowhawks predate small songbirds, such as starlings and thrushes, which feed on these molluscs and are also known to carry anticoagulant rodenticide residues.

Rodenticides may cause rodents to die in inaccessible areas, where it will be difficult to retrieve the dead bodies. This could cause problems with odours and in such locations it may be appropriate to consider alternative control methods, such as the use of traps, to help retrieve the dead bodies.

Where possible, prior to the treatment, inform any bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign.

6.4 Records

Make a record of where you have placed the bait, the product name of the rodenticide used and how much bait has been laid. For complex and/or large sites ask the client for a site map or if not available make one yourself. Record the positions where bait has been laid and, where required, put up warning signage to show that a treatment is in progress.

Inform employees and others with regular access to the site that a rodenticide treatment is in place, the products involved and any precautionary actions they should take. Where applicable, make those with

responsibility for the site aware of the risks involved and the action they should take in an emergency. Leave with them a copy of your record, including the site map showing the locations of baiting points. If possible, obtain their signature to confirm that they have received and understood the details of the work that has been carried out.

There may be instances where the treatment is carried out at a site where English is not the first language of some of those who work there. So, it may be difficult to ensure that the details of the treatment have been understood. Take reasonable steps to make sure that the hazards and risks associated with the treatment have been understood.

Photographs and digital aerial images may be useful for recording many aspects of rodent management programmes.

6.5 Monitoring

If you have decided that the application of a rodenticide is needed and the treatment phase is underway, it is important to monitor it regularly to track its progress. During revisits you should:

- search for, remove and safely dispose of any carcasses
- make sure there is enough bait available
- check that the baiting points remain secure
- check for evidence of any non-target animals gaining access to baits, including non-target mice and voles
- deal with spillages or other problems as they occur
- observe progress of the treatment

Effective monitoring needs a reliable recording system which will enable you to identify problems as the treatment progresses. This includes, for example, a reduction in efficacy of a usually effective rodenticide. Such observations should prompt a review of your treatment strategy.

Electronic systems are increasingly available for remote sensing rodent activity and for recording activities conducted during treatments. These are helpful developments that support best practice but do not entirely replace the requirement for practitioners to attend treated sites regularly.

6.6 Replenishing bait

Once laid, baits should be inspected frequently and where bait has been eaten, it should be replenished as necessary according to the schedule on the product label. Determine how frequently you need to inspect baits from the label instructions and the characteristics of the infestation. As a general guide, baits should be inspected and replenished (if necessary) no later than seven days after they were first laid and at least fortnightly thereafter. More

frequent visits will be required at sites with larger infestations, where burrow baiting has been used and where there are specific risks of bait disturbance and exposure to humans and non-target animals.

It is important to record the amount of bait put down, so you can decide whether larger amounts are needed. Continue baiting as instructed on the product label until all feeding activity has stopped, as overcoming the neophobic response in rats may take some time. However, if there is little evidence of bait takes after two to four weeks, it is unlikely that the treatment will prove to be effective and you may choose to remove the bait and consider an alternative strategy. Some populations of rats and mice are known to exhibit behavioural aversion to the apparatus used in rodent control, including rodenticide baits, bait boxes and traps. Conversely, if substantial bait takes continue over a long period, consideration should be given to the consumption of bait by non-target animals, immigration of rodents onto the site from neighbouring infested sites and, if neither of these is occurring, the presence of anticoagulant resistance must be suspected (see section 7.).

6.7 Removal of dying and dead rodents

Search for and remove any dying and dead rodents and dispose of them safely, in line with the product label. This is particularly important to reduce the risk of secondary poisoning, especially in areas where birds of prey and other predators/scavengers are known to be active, and where populations of outdoor rodents are being controlled. For further advice on the disposal of rodent bodies contact the Environment Agency in England and Wales, the Northern Ireland Environment Agency and, in Scotland, the Scottish Environment Protection Agency (see Further Reading).

6.8 Reinvasion

The risks of reinvasion from neighbouring sites must be considered, especially in urban areas where general environmental management may be poor. It is good practice to liaise with other rodent control practitioners, local authorities, regulatory agencies and the general public to coordinate control strategies and reduce risk of reinvasion. Where members of the public wish to feed wild birds, they should be encouraged to use feeders with a seed saucer to prevent spillages onto the ground and made aware that throwing bread and other food on the ground may, in addition to feeding the wild bird population, provide a food source for rats in the area. General advice on the storage of refuse and the use of rodent-proof bins should be provided where appropriate.

On farms, the risk of reinvasion may come from rats that are resident in neighbouring hedgerows, banks and ditches. Watercourses and hedgerows

often provide a means of concealed movement of rats between sites. It is essential during the initial site survey to discover the full extent of the infestation and any sources of reinvasion and to take appropriate action.

6.9 Permanent baiting

Permanent baiting in and around buildings may be necessary at sites where there is a constant source of reinvading rodents that cannot be dealt with at source. However, permanent baiting should never be used as a routine rodent control measure. Permanent baiting of strategic points in and around a building is permitted when dealing with sites that are at high risk of re-infestation or the health risk associated with a particular site is considered high, such as a food manufacturing facility or hospital. Bait stations positioned outdoors may be visited by non-target small mammals, such as field mice and voles, and present a significant risk of exposure for a wide variety of non-target wildlife that takes these animals as a food source. Remove rodenticide baits from outdoor bait points that show significant feeding by small mammals. This is recognisable by the size and colour of droppings found in bait stations.

Consider any permanent baiting programme carefully and justify it in your site survey for each location where this strategy is used. The preferred approach is to use either traps or non-toxic baits as a guide to the presence of an infestation of pest rodents that may then trigger the use of a rodenticide. Check baits regularly to establish whether rodents are present.

Bait stations should be established on likely runs by vulnerable buildings and premises. Where possible, these should be concealed. As well as being secure the bait should be protected from the effects of moisture. Baits based on whole grain and blocks are usually the most suitable for this purpose. Blocks and sachets should, where necessary, be secured inside bait stations. Where there is a risk of loose baits being shaken out of them bait stations should be secured.

Note that only certain products that contain the active substances bromadiolone, cholecalciferol and difenacoum can be currently used in permanent baiting programmes. Those products that can be used in this way will have appropriate text on product labels. Furthermore detailed guidance on permanent baiting is provided elsewhere (see Annex 1 and Further Reading: CRRU Guidance Permanent Baiting. Revised July 2019.).

It has become common practice to employ unpoisoned 'monitoring' baits to replace the use of permanent poisoned baits, which must not be used for monitoring. This practice is useful and serves to reduce the exposure of non-target rodents, such as

voles and wood mice, and birds which readily enter bait stations. However, monitoring baits are also attractive to non-target species and provision of this food source may increase the density of these animals at the treated site, making buildings more prone to ingress by them. Poisoned baits should not be deployed into bait boxes where monitoring baits used in them previously show signs of consumption by non-target rodents and birds.

6.10 Long-term baiting

Products that contain the active substances coumatetralyl, warfarin, brodifacoum, difethialone and flocoumafen cannot be used in permanent baiting. That is they cannot be used to prevent infestation or in monitoring. However, it may be permissible to apply products containing all active substances for long-term baiting (i.e. beyond 35 days) in some circumstances. These include:

- Very large and extensive infestations and the possible failure to recognise the size and extent of the infestation during the initial phase of the baiting programme.
- An initial reluctance of rodents to feed on baits, often caused by bait-shyness and/or refusal to enter bait boxes. This causes the effective start of the treatment to be delayed until the rodents begin to take baits.
- Continuing immigration of rodents onto the treated site from a source that cannot be itself treated.
- The circumstances at the site to be treated with respect to anticoagulant resistance. An infestation containing a proportion of resistant rodents may go unrecognised in the initial phase of the treatment. This will cause a prolonged treatment until the presence of resistance is either suspected or confirmed and appropriate alternative steps are taken.



6.11 Retrieval of bait

After you have finished the treatment, you must make every effort to ensure that all accessible traces of bait have been removed from the site and disposed of according to the label instructions. You cannot rely on others to carry out these tasks. If you are denied access to properties to do this, it is best practice to record when you attempted to retrieve the bait and write to the client to explain that you have a legal responsibility for the disposal of bait you laid.

If a previous practitioner has not removed the bait they laid, you should advise the client to write to inform them that a failure to collect rodenticide bait is a breach of the instructions on the product label. If the previous contractor refuses to remove their bait and/or equipment, then you can agree terms with the client for removal and disposal, if necessary in compliance with an assessment that these materials are classed as being contaminated with rodenticide waste.

Rodenticide that you have retrieved from a treatment you have undertaken may be reused if the bait is clean, remains in good condition and it has not been contaminated or marked by rodents, providing it can be stored in line with the conditions of authorisation of the product.

6.12 Storage of bait

Keep all rodenticides secure in a suitable store, preferably away from other pesticides which may taint the bait and make it unpalatable. You should keep bait in its original packaging, except when put into a new container for use, when a current copy of the product label should be attached. It is illegal to offer such relabelled bait for sale, or supply it to others.

6.13 Operations after removal of rodent infestations

Once adequate control has been achieved the following site management measures should be considered and implemented as appropriate:

- improving hygiene and clearing away rubbish
- reducing harbourage
- preventing the access of rodents to food sources
- proofing buildings

Areas that are prone to infestation and reinfestation should be monitored regularly to identify new rodent activity as soon as it becomes apparent and so prevent chronic infestations becoming established. Where you suspect fly-tipping or accumulation of rubbish may be contributing to the persistence of an infestation, the local authority

environmental health department may be able to help remove such accumulations.

Equipment used during treatments should be cleaned after use.

6.14 Rodent-borne diseases

Rodents carry diseases that may be serious or even life-threatening to people and animals. These may be caught by contact with surfaces or water contaminated with rodent urine. You should wear waterproof gloves when working in areas that may be infested. Cover cuts and abrasions on exposed parts of the body with waterproof dressings. Some rodent pathogens can also be inhaled as fine particles derived from dry rodent excrement. Use an appropriate device for respiratory protection when working in dry and dusty environments that contain rodent debris.

Remove overalls and gloves and wash exposed skin thoroughly before eating, drinking or smoking/vaping and after completing work. If you cut yourself, clean and dress the wound immediately. If you regularly work in rodent-infested areas, your employer should provide you with the HSE pocket card, 'Leptospirosis: are you at risk?'. Alternatively, you may obtain it on-line (<http://www.hse.gov.uk/pubns/indg84.pdf>).

Public Health England provides valuable additional information on the diseases carried by rodents that may be transmitted to humans, companion animals and livestock (see Further Reading: Zoonoses that can be acquired from rats: England and Wales.).

7 RESISTANCE

7.1 Anticoagulant resistance

Treatment failures may be due to inappropriate, poor quality/old bait, inadequate quantities of bait, poor bait placement, bait shyness and reinvasion from surrounding areas. But, if these factors have been considered and ruled out, and bait is being eaten by the target species without any significant decline in the rate of consumption, it may be a sign of the presence of anticoagulant resistance.

Resistance to anticoagulants has been confirmed in many rat populations in England, Scotland and Wales. There is confirmed resistance in Norway rats to the available first-generation anticoagulants (warfarin and coumatetralyl) and, in some increasingly large areas, to the second-generation anticoagulants bromadiolone and difenacoum. Up-to-date information on the geographical distribution of anticoagulant resistance among rats and mice in the UK is provided by the Rodenticide Resistance Action Committee of CropLife International (see Further Reading).

Anticoagulant resistance in mouse populations is so widespread, that no first-generation anticoagulant baits are advised for use against them. Resistance has been found in some house mouse strains to the second-generation anticoagulants bromadiolone and difenacoum. Do not rotate the use of different anticoagulants with comparable or weaker potency for resistance management purposes. For rotational use, consider using a non-anticoagulant rodenticide, if available, or a more potent anticoagulant.

The Rodenticide Resistance Action Group has issued a template in which the rodenticide active ingredients available in the UK are allocated to categories according to their usefulness against resistant strains of Norway rats and house mice (see Annex 3).

If you have ruled out all other possible explanations for the persistence of rodent populations and suspect you may be dealing with a resistant population, you should inform RRAG (the Rodenticide Resistance Action Group: RRAG, c/o BPCA Offices, 4A Mallard Way, Pride Park, Derby DE24 8GX. Website: <https://bpca.org.uk/rrag>). This information could identify areas of anticoagulant resistance and will complement the information that already exists about the distribution of resistant rats and mice in the UK. RRAG also provides advice about dealing with resistant infestations of rats and mice (see Further Reading: RRAG mouse resistance guideline and Anticoagulant resistance in the Norway rat and Guidelines for the management of resistant rat infestations in the UK.).

7.2 Behavioural resistance

Behavioural resistance in mice and rats has also been reported and if you suspect that you are dealing with such a population, you will need to consider alternative treatment regimens and control methods (e.g. placing bait directly on the floor rather than in bait boxes if it is safe to do so), alternative formulations (e.g. contact gels and foam) or alternative bait bases (e.g. baits based on ingredients that are similar to those the rodents are eating at the site).

8. SPECIFIC CONSIDERATIONS FOR DIFFERENT SITES OF RODENT INFESTATION

8.1 General

Each rodent-infested site presents a different set of circumstances for professionals who are required to apply control measures. Some sites, such as those in urban areas with little or no access to members of the public, domestic animals and wildlife will present few non-target risks. Sites with mouse

infestations which are restricted to indoor locations will carry little risk of non-target exposure to wildlife but there may be risks to human bystanders and to companion animals. At more rural sites, which are accessible to wildlife, there may be significant risk of non-target exposure. As a rule of thumb, the further the site is from areas of human occupation and/or habitation the more likely there is to be a risk of wildlife exposure, either directly from consuming baits or indirectly from consuming poisoned target rodents and non-target small mammals, such as field mice and voles.

More detailed advice on the practice of rodent pest management in all urban environments is provided by a document published by the Chartered Institute of Environmental Health (see Further Reading: Rat and Mouse Control Procedures Manual. A practical guide for Pest Control Technicians working in urban environments.).

In each of the following situations, rodenticide applications should only be made after consideration of the risk hierarchy and where the use of a rodenticide is deemed appropriate.

8.2 Domestic premises

Dealing with rodent infestations in and around domestic premises poses particular problems with placement and protection of bait. It is important to explain to the householder the risk associated with the use of rodenticides. Once baits have been laid, make sure the householder knows their location and is aware that they must not be moved or disturbed. Children and non-target animals, such as pets, may not be present at the time of your survey and/or treatment, but may be there at other times. If this is the case, it is important to place baits in such a way to prevent contact. If adults with learning difficulties are present, you must ensure that a responsible person has been informed of the treatment regime and the risks associated with the use of rodenticides. It is good practice to leave details about the products you have used, the appearance of the bait, the number and position of baits laid and the actions needed if bait is disturbed or consumed accidentally, and obtain where practicable the occupier's signature confirming full understanding of the treatment programme and the inherent risks to non-targets.

Where appropriate it may be necessary to provide similar information to the occupiers of neighbouring properties.

Unprotected stores of pet food may attract rodents and householders with pets should be advised to store such food in sealed containers. Poorly constructed compost heaps and compost bins placed directly onto soil may provide harbourage for rats and should be inspected during your survey.

Correct use and maintenance of compost bins should be advised, in accordance with the guidance on composting from the Chartered Institute of Environmental Health (see Further Reading).

The practice of feeding garden birds is common in domestic premises and food left available on bird tables and in bird feeders is highly attractive to rats (see Section 6.9). If rats become established around bird feeders the food should be removed to prevent access to it. Bird food should be stored safely in the same way as pet foods.

8.3 Block treatments

Effective control of rodents in the urban environment may be difficult in premises with multiple uses and/or occupiers. There may be several agencies involved in controlling rodents. Where possible it is good practice to co-ordinate control measures to make sure all premises on that site are inspected and, where necessary, treated. This will reduce the chances of rodents surviving the treatment by avoiding control measures and reinvading the areas you have treated.



8.4 Commercial (non-food) premises

The risk of infestation within commercial, non-food premises will be influenced by the work that takes place in them. A thorough survey should establish the areas that may be prone to infestation. Where catering facilities and food waste are on site these may be important areas to examine in detail.

8.5 Commercial (food) premises

Under food safety legislation, owners of food premises must periodically visually check for signs of pests and have a pest control reporting system in place. This should provide you with information on any recent sightings and may provide details of previous treatments. Detailed advice and recommendations of the management of rodent pests in commercial food premises are provided by the Chartered Institute of Environmental Health

(see Further Reading: Pest control procedures in the food industry.).

8.6 Large institutions (e.g. hospitals, prisons, schools etc.)

Large institutions may have several locations that are prone to infestation. The presence of vulnerable individuals and restricted or limited access to particular areas will need to be considered when deciding your control strategy. On-site kitchens may be an important focus of rodent activity. If waste disposal systems for food discharge directly into the drainage/sewer system, this could act as a rich source of food for rodents. So it is essential that you do a thorough survey and the methods and routes for disposal of food waste are established. Rodents may also invade other parts of the building when food is transported from the kitchen to where it is eaten. Service ducts may provide a route for the rapid spread of rodents through the complex and should be examined for evidence of rodent activity. If the ducting is classified as an enclosed space, then those undertaking inspections and treatments must be adequately trained to work in confined spaces.

Access restrictions to particular areas of the site may mean that it is not feasible to place traps and rodenticide baits in all parts. Integrating a range of control methods, combined with close monitoring of the progress of the control programme, is essential.

8.7 Parks, gardens and other open areas

Dealing with rodent problems in open situations, both in rural and urban areas, creates particular problems regarding the protection of bait points, particularly where rats may be associated with lakes and ponds. Place baits directly into active burrows, especially in areas where the public has restricted access, such as islands on a lake. Cover all treated holes, and regularly monitor for evidence of bait consumption, spillage or disturbance. Record the position of all baits laid on a sketch plan, or via Global Positioning System (GPS) coordinates (mobile working), as appropriate. Where bait is placed in areas of public access it is now a regulatory requirement that areas treated must be marked during the treatment period and a notice explaining the risk of primary and secondary poisoning must be made available alongside the baits.

Products containing the active substances brodifacoum, difethialone and flocoumafen are not authorised for use in open areas.

Other open areas where similar considerations would apply are railways (embankments, cuttings etc.), canals and the banks of natural water courses, reservoirs, footpaths, bridleways, cycle paths, allotments and airports/air-fields.



8.8 Sewers

Sewers of all kinds provide an ideal environment for rats, especially if the structure is in poor repair. A protocol agreed between the Local Government Association and Water UK, in liaison with water authorities and water companies in England and Wales was issued in November 2000, and subsequently revised and updated in 2012, to ensure better coordination of rodent control in public sewers.

Sewers are now a separate area of use, no longer covered under 'in and around buildings', specified on product labels.

The treatment of rodent infestations of sewers inevitably involves the application of rodenticide. This is a specialist operation and is usually conducted by teams that are specially trained and equipped for such work. A guidance document on the treatment of rat infestations in sewers is available from the website of the National Pest Advisory Panel of the Chartered Institute of Environmental Health (see Further Reading).

It is essential that every effort should be made to avoid the discharge of rodenticide baits into the sewerage stream. Such discharges cause a risk of exposure of rodenticides to the aquatic environment and the animals within it. Methods are available to retain baits applied in sewers and to prevent, as far as possible, discharge of bait into the sewer flow. Product labels state "Baits must be applied in a way so that they do not come into contact with water and are not washed away."

8.9 Farms and farm buildings

The average farm has a range of buildings, including grain storage facilities and animal-rearing accommodation. You may find infestations in all these places as well as outdoor locations in the immediate vicinity. It is also likely that livestock, domestic animals, including cats and dogs, will be using or visiting various parts of the holding. Children may also be present. Specific advice on



the control of rodents on poultry farms is available from the Department for the Environment and Rural Affairs, advice on the control of rodents on livestock farms is provided by Natural England and general advice about the control of rodents on farms is given by the Agriculture and Horticulture Development Board (see Further Reading).

Your site survey should have identified where the rats are living, travelling and feeding and the scope for the removal of food and harborage to reduce the rodent carrying capacity of the site. The COSHH assessment should have helped you to decide on the most suitable methods of controlling rodents including, if rodenticides are to be used, the rodenticide active ingredient and formulation, and the best method of presenting the bait to achieve rodent control with the least risk to children and animals.

Because of their rural locations, farms are very likely to be visited by a wide range of wildlife species. An environment risk assessment should always be carried out and special care is required when putting out bait to avoid, as far as possible, the unnecessary exposure of wildlife (see Further Reading: Environmental assessment when using anticoagulant rodenticides in the United Kingdom.).

8.10 Livestock units

Similar precautions should be taken as when applying rodenticides as in other agricultural holdings. However, special care is needed in livestock units to make sure that stock animals are not exposed. Do not place baits where animals are likely to be able to gain direct access. Avoid baiting in areas which could result in rodenticides falling into yards, pens or cages. Where pigs are present, it is particularly important that you make regular checks, because they will eat rodent carcasses and are particularly sensitive to warfarin. Where baiting is carried out in livestock units that are not associated with a permanent building, such as in certain poultry and pig-rearing systems, this use is considered to be in an 'open area' and only products authorised for such use should be applied.

8.11 Straw stacks and other stored commodities

Stored feeding stuff and bedding, such as stacks of bales outdoors or in Dutch barns, are particularly attractive to rodents, especially during winter. The incorporation of rodenticides as 'place packs' during the construction of stacks of hay and straw bales presents unacceptable risk to non-target animals and livestock because the packs cannot be reliably recovered.

If a significant rat infestation occurs, and baiting is the only appropriate control method either within or around the stack, then take account of the possibility that baits may become exposed or disturbed as the stored material is used and that children or non-target animals may have unrestricted access to the site. In such circumstances, bait placed in plastic bags or applied loose may be particularly hazardous to wildlife and other animals, and may also contaminate the stored product. You need to tell anyone likely to dismantle stacks how important it is to ensure that bait remains protected.

Use suitable bait containers such as tamper-resistant bait boxes. Lengths of drainpipe may also be used for protecting baits, but do not use pipes of excessively large diameter and ensure they are long enough to stop long-necked birds reaching the bait. Consider using pipes with baffles or restricted entrance sizes to reduce the risk of spillage of bait. These points may be in position for several months, so consider the placement position carefully.

Take particular care where a public footpath runs close to the treatment areas or other general access is foreseeable. In such circumstances it is necessary to put up warning notices.

Monitor such treatments frequently and check for evidence of displaced bait points, spillage or interference. As the straw or other material is used up, remove bait stations that have become exposed. Dispose of uneaten bait and any dead rodents you may find by following the label advice, or using the services of a specialist waste contractor.

8.12 Ditches, hedgerows and woodland

Significant rat infestations in open countryside only occur in places where food availability is high. It is always necessary, in terms of the 'risk hierarchy', to remove sources of food for rodents rather than to apply rodenticides.

If baiting is unavoidable, dealing with rodent problems in open rural situations creates additional problems regarding the protection of bait points, particularly where rats are living in burrows excavated in soil. All such applications are considered to be in 'open areas' and, once again, only baits authorised for this use should be applied.

A typical 'open area' use of rodenticides is by gamekeepers to protect stations put out for supplementary feeding of gamebirds. These stations are particularly attractive to rats, as well as a range of other wildlife species. Therefore such use brings considerable risk of exposure to rodenticides of wildlife. A document which provides advice to those who are considering the use of rodenticides to support game-rearing activities is available (see Further Reading).

Baits placed in open areas far from human habitation are the most likely to be encountered by wildlife because of its greater abundance in these remote areas. Special care is required in the use of rodenticides, especially the second-generation anticoagulants, in these situations. Where mouse droppings are found in bait containers in open areas they are likely to be from non-target small mammals, such as field mice and voles. The contamination of these animals by rodenticides is an important source of wildlife exposure.

8.13 Railways (embankments, cuttings etc.), canals and natural water courses, reservoirs

The open areas addressed in the previous section present a number of challenges, as they are open to the public, domestic and wild non-target species, so appropriate risk mitigation measures should always be undertaken and rodenticides applied according to label requirements, environmental risk assessments and the general principles of best practice.

Railway embankments are well known as sites of rat harbourage and infestation. Rats damage cables in these areas, leading to signalling and power failures in the railway industry and causing significant economic damage and risk to human safety. A considerable amount of litter and undergrowth can be found along railways, which is an attraction for rats. Rabbits are an example of a typical non-target species (in terms of rodenticide use) that are found along railway embankments and care should be taken to identify rabbit burrows (as well as the burrows of other non-target species) versus rat burrows before applying rodenticide.

Natural water courses provide a habitat for water voles, which are protected under the Wildlife and Countryside Act 1981. The Wildlife Trusts give pest control operators guidance on rodent control in areas of water vole activity (see Further Reading).

8.14 Footpaths, bridleways, cycle paths

These areas are open to the public, domestic animals and non-target wildlife. The general principles of control in this document are also relevant here. Litter left by the public can be an attraction to rodents in these areas.

8.15 Allotments

Compost bins used on allotments in open areas attract rats, providing a food source and harbourage. Correct use and maintenance of compost bins should be advised, in accordance with the CIEH guidance on composting (see Further Reading). Following this guidance can help to limit rat activity and therefore reduce rodenticide use at allotments, leading to a reduction in the risks posed to non-target species. Foodstuffs grown on allotments also attract rodents, along with chicken feed and other domestic animal feed frequently found on such sites.

8.16 Airports

A number of features of airports provide harbourage for rats and are conducive to rat activity in the open areas of such sites. For example, areas of long grass cultivated at airports to reduce habitats for flocking birds, and therefore to reduce bird-strikes of aircraft, may provide rat harbourage. Natural predation of rats is also limited at airports due to the discouragement of raptors by various means and exclusion of other carnivores by fencing. Although non-target species are discouraged at airports, they may still be present, as can airport workers, so the presence of these non-targets should be considered when compiling a control strategy.

Areas around airport perimeter fences are subject to fly-tipping, thus providing harbourage and food sources for rats. Perimeters should be inspected for rodent activity.

Regarding control of rats at the open area sites relevant to public health that are described in 8.8 to 8.16, the principles of control given in section 8.7 (Parks and Gardens) are particularly relevant and should be adhered to, as well as the principles described throughout this document.

9. LEGAL STATUS OF CRRU GUIDANCE

The CRRU Code of Best Practice was initially conceived to be 'guidance' on best practice for practitioners and was not intended to imply any statutory and legal obligation. This situation has changed because reference is now made to the Code on all rodenticide product labels authorised for use by professionals, with words such as "Refer to the CRRU UK Code of Best Practice (or equivalent) for guidance". The Biocidal Products Regulation states that "biocidal products shall be used in compliance with the terms and conditions of authorisation". It is now therefore a requirement of the authorisation for professional rodenticide products that this CRRU guidance document should be followed. However, in the normal way, in determining whether risks are properly managed, HSE Inspectors would take into account what steps professional users took to achieve control, this will include determining whether users followed equivalent guidance, which might complement or mirror CRRU advice, in order to achieve control.

FURTHER ADVICE

You can get further advice on dealing with rodent infestations from rodenticide manufacturers and distributors and also from:

- British Pest Control Association (BPCA) (Tel: 01332 294288 website: <http://www.bpca.org.uk>)
- National Pest Technicians Association (NPTA) (Tel: 01773 717 716 website: <http://www.npta.org.uk/>)
- Chartered Institute of Environmental Health (CIEH) (Tel: 020 7928 6006 website: <http://www.cieh.org/>)
- Environment Agency (EA) (Tel: 03708 506 506 website: <https://www.gov.uk/government/organisations/environment-agency>)
- Natural England (NE) (Tel: 0845 600 3078 website: http://www.naturalengland.org.uk/about_us/contact_us/default.aspx)
- Department for Environment, Food and Rural Affairs (Defra) (Tel: 03459 33 55 77 website: <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)
- For guidance on the legislation, consult the Health and Safety Executive (HSE) (Infoline: 0300 003 1747 website: <https://www.hse.gov.uk/contact/contact.htm>)
- For guidance on environmental risk assessment, go to: <https://www.thinkwildlife.org/downloads/>

FURTHER READING

[All URLs were correct on 4 May 2021.]

Rodents and disease:

Guidelines for the Investigation of Zoonotic Disease (non-foodborne) in England and Wales. v2, July 2016. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/535155/Guidelines_for_Investigation_of_Zoonotic_Disease.pdf

Urban pests and their public health significance: A CIEH summary. Chartered Institute of Environmental Health, Hatfields, London, June 2008. 48 pp. URL: <https://www.urbanpestsbook.com/downloads/urban-pests-public-health-significance/>

Some statutory instruments and the Stewardship Regime

Her Majesty's Government. The Spring Traps Approval (England) Order 20182018 No. 1190 Animals, England, Prevention of Cruelty. URL: <https://www.legislation.gov.uk/primary+secondary?title=spring%20traps>

Her Majesty's Government. Animal Welfare Act 2006. URL: <http://www.legislation.gov.uk/ukpga/2006/45/contents>.

Health and Safety Executive. Anticoagulant rodenticides and biocides legislation. URL: <https://www.hse.gov.uk/biocides/eu-bpr/rodenticides.htm>

European Chemicals Agency. Biocidal Products Committee opinions on active substance approval. URL: <https://echa.europa.eu/regulations/biocidal-products-regulation/approval-of-active-substances/bpc-opinions-on-active-substance-approval>

Wildlife management policy:

Wildlife management in England. A policy making framework for resolving human-wildlife conflicts. February 2010. Department for Environment, Food and Rural Affairs, Nobel House, London, UK. 40 pp. URL: <https://www.thenbs.com/PublicationIndex/documents/details?Pub=DEFRA&DocID=295502>

Environmental management – guidance. Bats: protection, surveys and licences. Her Majesty’s Government. URL: <https://www.gov.uk/bats-protection-surveys-and-licences>

Other general best practice guidance:

The control of rats with rodenticides: a complete guide to best practice. Natural England, UK. 67 pp. URL: <http://adlib.everysite.co.uk/adlib/defra/content.aspx?id=000HK277ZX.0B4BFWYAF84FL>

Rat and Mouse Control Procedures Manual. A practical guide for Pest Control Technicians working in urban environments. March 2019. Chartered Institute of Environmental Health, Hatfields, London. 20 pp. URL: <https://www.urbanpestsbook.com/download/rat-and-mouse-control-procedures-manual-a-practical-guide-for-pest-control-technicians-working-in-urban-environments/>

Guideline on Best Practice in the Use of Rodenticide Baits as Biocides in the European Union. The European Chemical Industry Council, European Biocidal Products Forum, Rodenticides Working Group. Brussels, Belgium. 23 pp. URL: <https://rrac.info/content/uploads/CEFIC-EBPF-RWG-Guideline-Best-Practice-for-Rodenticide-Use-FINAL-S-.pdf>

BRC Global Standard for Food Safety: Issue 6. The British Retail Consortium. The Stationery Office. ISBN 978011706971.

The British Pest Management Manual. Royal Society for Public Health. ISBN 978-0-9563690-2-2. Available at: http://www.bpca.org.uk/pages/index.cfm?page_id=81

Guidance on the application of permanent baiting

CRRU Guidance Permanent Baiting REVISED JULY 2019. Campaign for Responsible Rodenticide Use. 12 pp. URL: <https://www.thinkwildlife.org/downloads/>

Best practice for specific sectors:

Pest control procedures in the food industry. Chartered Institute of Environmental Health, Hatfields, London, October 2009. 52 pp. URL: <https://www.urbanpestsbook.com/download/pest-control-procedures-food-industry-3/>

Pest control procedures in the housing sector. Chartered Institute of Environmental Health, Hatfields, London, October 2009. 64 pp. URL: <https://www.urbanpestsbook.com/download/pest-control-procedures-housing-sector-2/>

Good composting practice Guidance on composting without attracting rodents. Chartered Institute of Environmental Health, Hatfields, London, September 2009. 4 pp. URL: <https://www.urbanpestsbook.com/downloads/>

Code of Practice for the Control of Rats on Poultry Farms. Department for Environment, Food and Rural Affairs, Nobel House, London, UK. URL: https://assurance.redtractor.org.uk/contentfiles/Farmers-6498.pdf?_id=635912157136532364

Rat Control and Game Management. Campaign for Responsible Rodenticide Use. 16 pp. URL: https://www.thinkwildlife.org/downloads/?cp_downloads=2

National Sewer Baiting Protocol Best Practice and Guidance Document. Chartered Institute of Environmental Health, Hatfields, London. <https://www.urbanpestsbook.com/download/national-sewer-baiting-protocol-best-practice-guidance-document/>

Water voles vs. rats: how to tell the difference. The Wildlife Trusts. URL: <https://www.wwt.org.uk/news/2019/05/22/how-to-tell-the-difference-between-water-voles-and-rats/16947#>

Continuing Professional Development

Campaign for Responsible Rodenticide Use. Continuing Professional Development (CPD) Modules. URL: <https://www.thinkwildlife.org/training-certification/continuing-professional-development-cpd-and-stewardship/>

Risk Assessments

Risk assessment. A brief guide to controlling risks in the workplace. Health and Safety Executive 08/14 INDG163(rev4). 5 pp. URL: <https://www.hse.gov.uk/search/search-results.htm?gsc.q=indg163.pdf.#gsc.tab=0&gsc.q=indg163.pdf.&gsc.page=1>

Health and safety regulation...a short guide. Health and Safety Executive HSC13(rev1) 08/03 7 pp. URL: <https://www.hse.gov.uk/pubns/hsc13.pdf>

Working with substances hazardous to health: A brief guide to COSHH. Health and Safety Executive INDG136(rev5) 10/12. 10 pp. URL: <https://www.hse.gov.uk/pubns/indg136.htm>

Environmental assessment when using anticoagulant rodenticides in the United Kingdom. Campaign for Responsible Use UK. 6 pp. URL: <http://www.thinkwildlife.org/>

Environmental risk assessment form. Campaign for Responsible Use UK. 2 pp. URL: <http://www.thinkwildlife.org/>

Disposal of Rodent Bodies

SEPA Position Statement - Burial of small quantities of rodent carcasses poisoned on farmland. National Waste Policy Unit. Scottish Environment Protection Agency. March 2009. 2 pp. URL: https://www.sepa.org.uk/media/156483/wst_ps_burial_poisoned_rodents_farmland.pdf

Tamper-resistant bait stations

Concept of "tamper-resistant" bait station for the use of anticoagulant rodenticides. Note for Guidance. European Commission, Health and Food Safety Directorate General, Safety of the Food Chain, Pesticides and Biocides, 1049, Brussels, Belgium. Document: CA-Sept16-Doc.4.1.c – Final. 6 pp. URL: <https://circabc.europa.eu/v/CA-Nov16-Doc.4.1.b>

Traps and sticky (glue boards)

Code of Practice for Use of Vertebrate Traps. Chartered Institute of Environmental Health, Hatfields, London. 20 pp. URL: <https://www.urbanpestsbook.com/download/code-practice-use-vertebrate-traps/>

Code of Best Practice Humane Use of Rodent Glue Boards. Pest Management Alliance. 1 p. URL: https://bpca.org.uk/write/MediaUploads/Documents/Codes%20of%20Best%20Practice/CoBP_Pest_Management_Alliance_Humane_Rodent_Glue_Boards.pdf

Application of toxic gases:

The RAMPs UK Code of Good Practice. Register of Accredited Metallic Phosphide Standards in the UK. December 2013. URL: <https://www.ramps-uk.org/>

Guidance on anticoagulant resistance:

RRAG mouse resistance guideline. Rodenticide Resistance Action Group. 11 pp. URL: <https://bpca.org.uk/rrag>

Anticoagulant resistance in the Norway rat and Guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group. 9 pp. URL: <https://bpca.org.uk/rrag>

RRAC guidelines on Anticoagulant Rodenticide Resistance Management. Rodenticide Resistance Action Committee. CropLife International, Brussels, Belgium. 32 pp. URL: <https://rrac.info/>

Maps of anticoagulant resistance foci of Norway rats and house mice in the UK. Rodenticide Resistance Action Committee. CropLife International, Brussels, Belgium. URL: <https://guide.rrac.info/resistance-maps.html>

Animal Welfare:

Humane Rodent and Mole Control. Universities Federation for Animal Welfare. URL: <https://www.ufaw.org.uk/rodent-welfare/rodent-welfare>

Pesticides Safety Directorate. Assessment of humaneness of vertebrate control agents. Issue No. 171. December 1997. 39 pp. (Quoted in Mason G and Littin K. E. The humaneness of rodent pest control. Animal Welfare 2003 vol.12, 38 pp.)

ANNEX 1

Permanent baiting is a procedure used in the UK by professional users with demonstrated competence (equivalent to trained professionals) requiring the following risk mitigation measures.

- Only professional users with demonstrated competence (equivalent to trained professionals) should carry out permanent baiting programmes.
- Permanent baiting should not be used as a routine practice.
- Permanent baiting should be considered if a building is under an ongoing threat of rodent infestation that might cause unacceptable risks to human and animal health.
- All other means of prevention of rodent infestation of vulnerable areas around the building should be considered before permanent baiting is undertaken.
- Reasons why alternatives are either impractical or unlikely to be effective should be documented.
- If the source of a risk of infestation is from neighbouring land or premises all methods should be explored to treat the risk at source.
- As with other rodenticide applications conducted outside, an environmental risk assessment should be conducted before external permanent baiting is implemented.
- The areas of the site that are permanently baited should be kept to a necessary minimum.
- Areas that provide obvious habitats for non-target small mammals, such as field mice and voles, should not be baited with rodenticides.
- Sites under a permanent baiting regime should be inspected regularly in accordance with product label directions. The period between visits should be determined by the technician in charge but should not be longer than every four weeks when permanent baiting is conducted outdoors.
- The frequency of visits for an indoor permanent baiting regime should be determined by the technician in charge and should be in accordance with the site survey and/or risk assessment supporting the baiting programme. However, you should note that permanent baiting is only permissible at sites which you judge to have “a high potential for reinvasion” and this should always be considered when setting the frequency of re-visits.
- Those who check permanent bait points should assess the condition and integrity of any bait contained in them and should replace bait that is in unsatisfactory condition when necessary.
- Permanent bait points that only show signs of bait take by wild small mammals, such as field mice and voles, should either be removed or the bait in them replaced by placebo bait.
- Rodenticide should be removed from permanent bait points that show a series of consecutive no takes by pest rodents. In such cases the justification for permanent baiting should be reviewed. The bait boxes may be left in place and placebo baits applied.

ANNEX 2

Burrow baiting is a procedure used in the UK by professional users with demonstrated competence (equivalent to trained professionals) requiring the following risk mitigation measures.

- Burrow baiting will not be used as a routine practice.
- Burrow baiting will be considered at sites where there is evidence that baits placed in tamper-resistant bait stations, or in other covered and protected bait stations, would not be sufficiently effective. Reasons why alternatives are either impractical or unlikely to be effective will be documented.
- Where possible, prior to the treatment any possible bystanders (e.g. users of the treated area and their surroundings) will be informed about the rodent control campaign.
- As with other rodenticide applications conducted outside, an environmental risk assessment will be conducted before burrow baiting is implemented.
- The areas of the site that are burrow baited will be kept to a necessary minimum.
- The bait will be introduced into treated borrows as deeply as possible using a long-handled spoon or other suitable implement. Deep vertical burrows, from which there is little likelihood of bait being ejected are preferable to those which are shallow and run horizontally.
- When block baits are used, if possible, they will be securely fastened on robust wire, which is itself secured to the substrate, and introduced as deeply as possible into the burrow.
- Treated burrows will be marked and/or recorded to allow them to be easily found and inspected during revisits.
- Baited burrows will be lightly blocked with materials such as hay/straw/grass or, where practicable, will be covered with corrugated sheets, wooden boards or similar materials.
- Sites where burrow baiting is used will be inspected regularly, preferably in the early morning, to check for bait that has been ejected from burrows. The frequency of visits should be determined by the technician in charge but, given that it is likely that some baits will be ejected from treated burrows, daily visits may be necessary at some sites.
- At the end of the treatment the treated site will be re-visited and all reasonable efforts will be made to recover and dispose of safely any unconsumed baits.

ANNEX 3

Rodenticide Resistance Action Group: Classification of Active Substances for Resistance Management

The use of ONLY effective active substances against resistant infestations of house mice and Norway rats has important benefits:

- (1) Rodent infestations are controlled quickly and efficiently.
- (2) The spread and increases in severity of resistance are prevented.
- (3) Unnecessary and often high emissions to the environment of rodenticide active substance are avoided.

The classification of rodenticide active substances that are authorised in the UK given below will help users to decide which active substances to use when they encounter resistant rodent infestations.

Group	Sub-Group	Compounds	Recommended uses	
1	A	FGAR warfarin, coumatetralyl	For use against Norway rats when there is no resistance to anticoagulants.	
	B	SGAR bromadiolone, difenacoum	For use against Norway rats when there is no resistance to anticoagulants, and against rats carrying mutations (L128Q and Y139S).	
	C	SGAR brodifacoum, difethialone, flocoumafen	For use against house mice, and all strains of resistant rats (L128Q, L120Q, Y139S, Y139C, Y139F).	
2	-	-	cholecalciferol	Recommended against house mice, and all strains of rats.
3	-	-	alphachloralose	Recommended for control of all strains of house mouse.
4	-	-	carbon dioxide, aluminium phosphide, hydrogen cyanide	Specific applications by trained professionals only. Species restrictions may apply.

General guidance:

- Always know the name of the active substance you are using and follow the instructions on the product label.
- The use of full-strength baits (i.e. containing 50 ppm if it is a Group 1B and 1C active ingredient) will ensure that treatments are conducted quickly and efficiently, and the risk of partial treatment failure will not increase the severity of resistance and promote its spread.

THE CRRU CODE IS:

Always have a planned approach

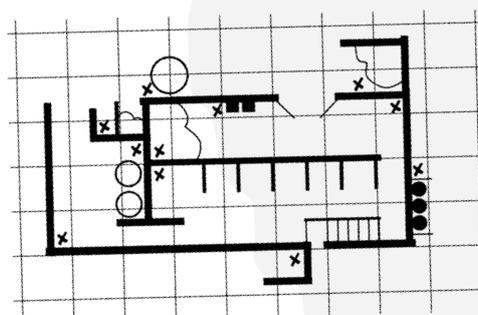
- Before treatment begins, a thorough survey of the infested site is an essential key to success when using any rodenticide.
- Environmental changes which could be made to reduce the attractiveness of the site to rodents should be noted for implementing after the treatment. Usually this will involve rodent proofing and removing rubbish and weeds that provide harbourages and cover. However, the site should not be cleared before treatment since this will disturb the rodent population and make bait acceptance more difficult to achieve.
- Obvious food, such as spilled grain, should be removed as far as possible and any food sources covered.
- Rodenticide baits should only be used for as long as is necessary to achieve satisfactory control.
- In most cases, any anticoagulant bait should have achieved control within 35 days. Should activity continue beyond this time, the likely cause should be determined and documented. If bait continues to be

consumed without effect, a more potent anticoagulant should be considered. If bait take is poor, relative to the apparent size of the infestation, consideration should be given to re-siting the bait points and possibly changing to another bait base, as well as making other environment changes.



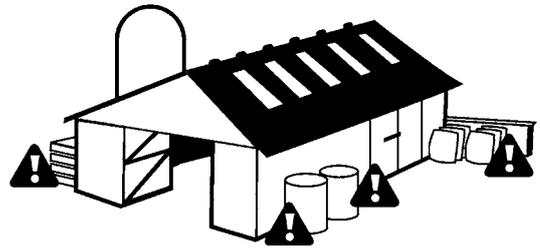
Always record quantity of bait used and where it is placed

- A simple site plan or location list identifying areas of particular concern pertinent to the site should be drawn up and retained on file.
- A record of all bait points and the amount of bait laid should be maintained during the treatment. Activity should be noted at each bait point, including any missing or disturbed baits, as the treatment progresses.
- By carefully recording the sites of all bait points responsible users of rodenticides are able to return to these sites at the end of the treatment and remove uneaten bait so that it does not become available to wildlife.



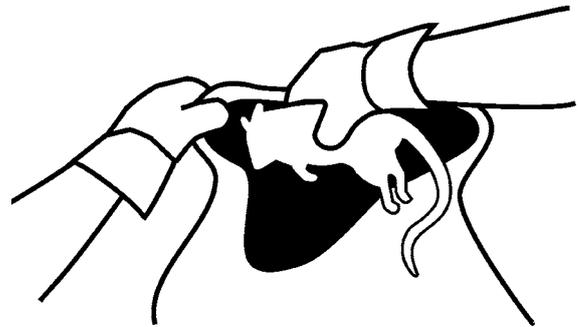
Always use enough baiting points

- Users should follow the label instructions regarding the size and frequency of bait points and the advice given regarding the frequency and number of visits to the site.
- By using enough bait points the rodent control treatment will be conducted most efficiently and in the shortest possible time. This will restrict the duration of exposure of non-target animals to a minimum.



Always collect and dispose of rodent bodies

- The bodies of dead rodents may carry residues of rodenticides and, if eaten by predators or scavengers, may be a source of wildlife exposure to rodenticides.
- It is essential to carry out regular searches for rodent bodies, both during and after the treatment period. Bodies may be found for several days after rats have eaten the bait and rats may die up to 100 metres or more away from the baited site.
- Any rodent bodies should be removed from the site and disposed of safely using the methods recommended on the label.



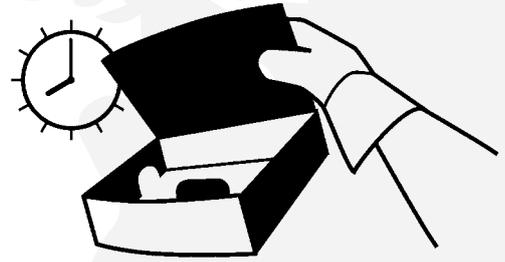
Never leave bait exposed to non-target animals and birds

- Care should be taken to ensure that bait is sufficiently protected to avoid accidentally poisoning other mammals and birds. Natural materials should be used where possible.
- Bait stations should be appropriate to the prevailing circumstances. They should provide access to the bait by rodents, while reducing the risks of non-target access and interference by unauthorised persons. They should protect the bait from contamination by dust or rain. Their design, construction and placement should be such that interference is minimised.



Never fail to inspect bait regularly

- Where the risk assessment or treatment records show that multiple visits are required, then those should be made as frequently as is considered necessary. Daily inspection may be required in some circumstances.
- At each visit, baits should be replenished according to the product label and a thorough search made to ensure that bodies and any spilled bait are removed and disposed of safely. Records of such visits should be maintained.



Never leave bait down at the end of the treatment

- Bait left out at the end of a treatment is a potential source of contamination of wildlife.
- On completion of the treatment, records should be updated to signify that the infestation is controlled and that, as far as reasonably practical, all steps have been taken to ensure that the site is now free of rodenticide bait.



For further details on CRRU see:
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CRRU UK is supported by the following companies:

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